Sweat analysis & Cystic Fibrosis

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Sweat analysis

- Sweat test analyses the amount of salts (NaCl) in sweat.
- NaCl part of healthy body's electrolyte balance
- These salts help to regulate the fluid balances in our tissues
- Normally healthy people's sweat contains very little amount of NaCl
- People with cystic fibrosis (CF) tend to have 2-5 times more then normal amounts

Cystic fibrosis

- CF is the most common inherited genetic disorder affecting children of white population
- Less common in Blacks and Asians
- This is autosoamal recessive disorder
- Presence of mutant allele on maternal and paternal allele
- Children inherit mutant allele from both parents then disease appears
- On Chromosome No. 7

Cystic fibrosis

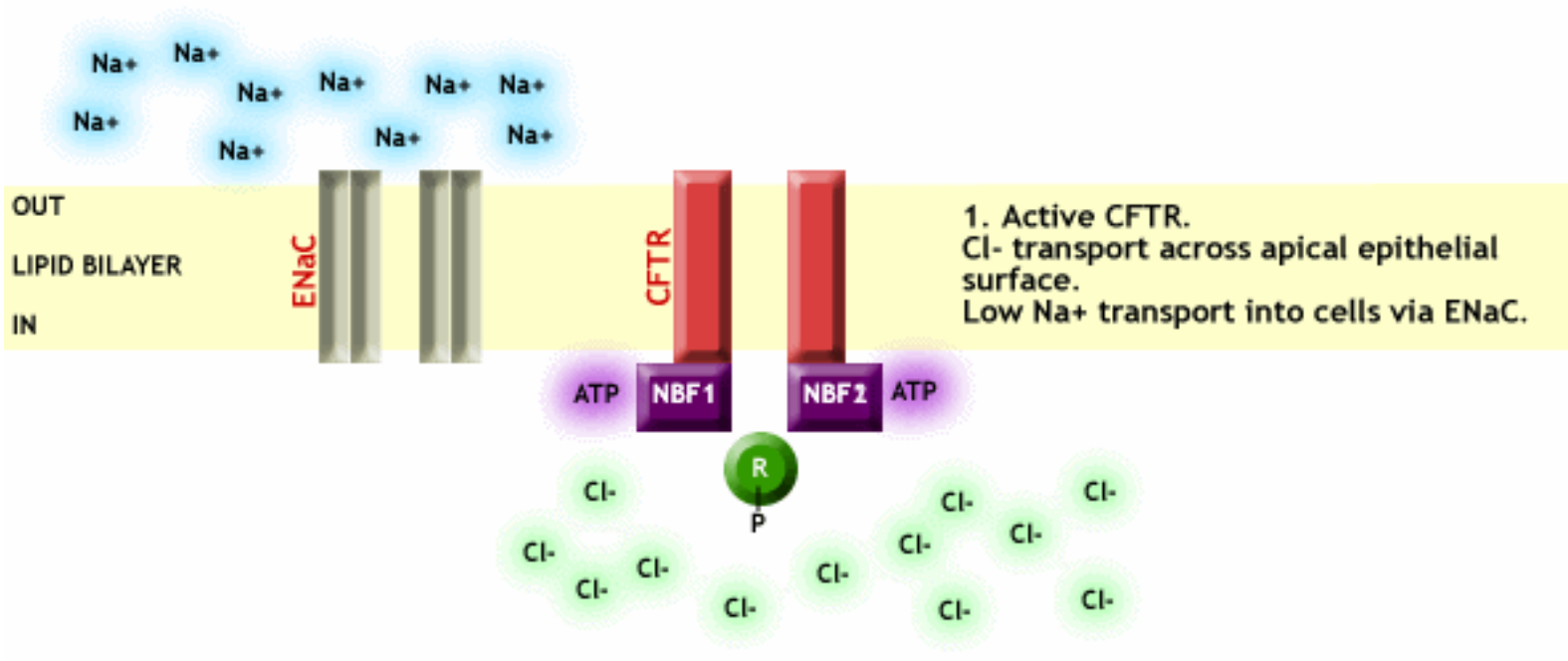
- CFTR (cystic fibrosis transmembrane conductance regulator protein) is the functional product of CFTR gene
- CFTR is helpful in Cl^- ions transportation out of cell in epithelia of lungs and $HCO3^-$ ions in GI tract
- CFTR also interferes with Na^+ channel function
- There by regulating the conductance of epithelial cell membrane

Cystic fibrosis

- CFTR normal function is helpful in muco-celiary clearance

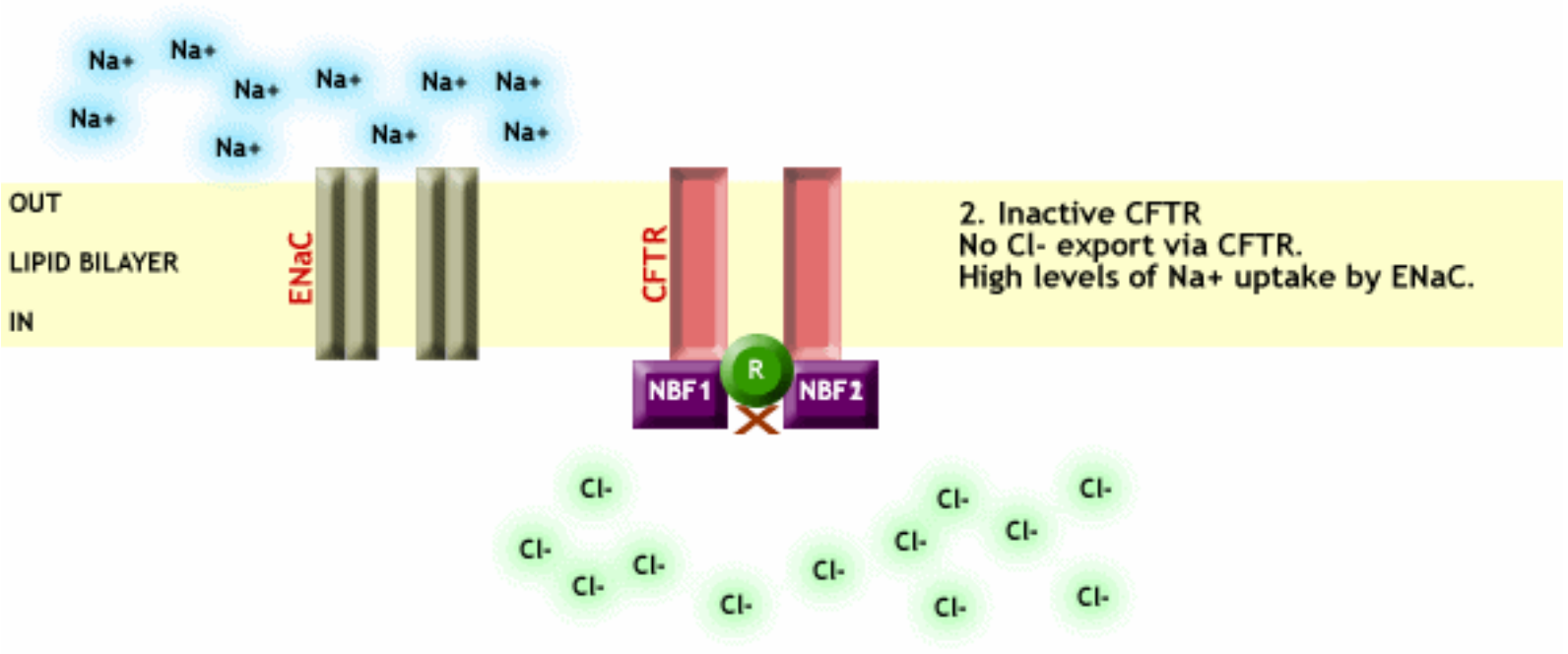
Cystic fibrosis

- Normal CFTR function in lung epithelium



Cystic fibrosis

- Abnormal CFTR function in lung epithelium

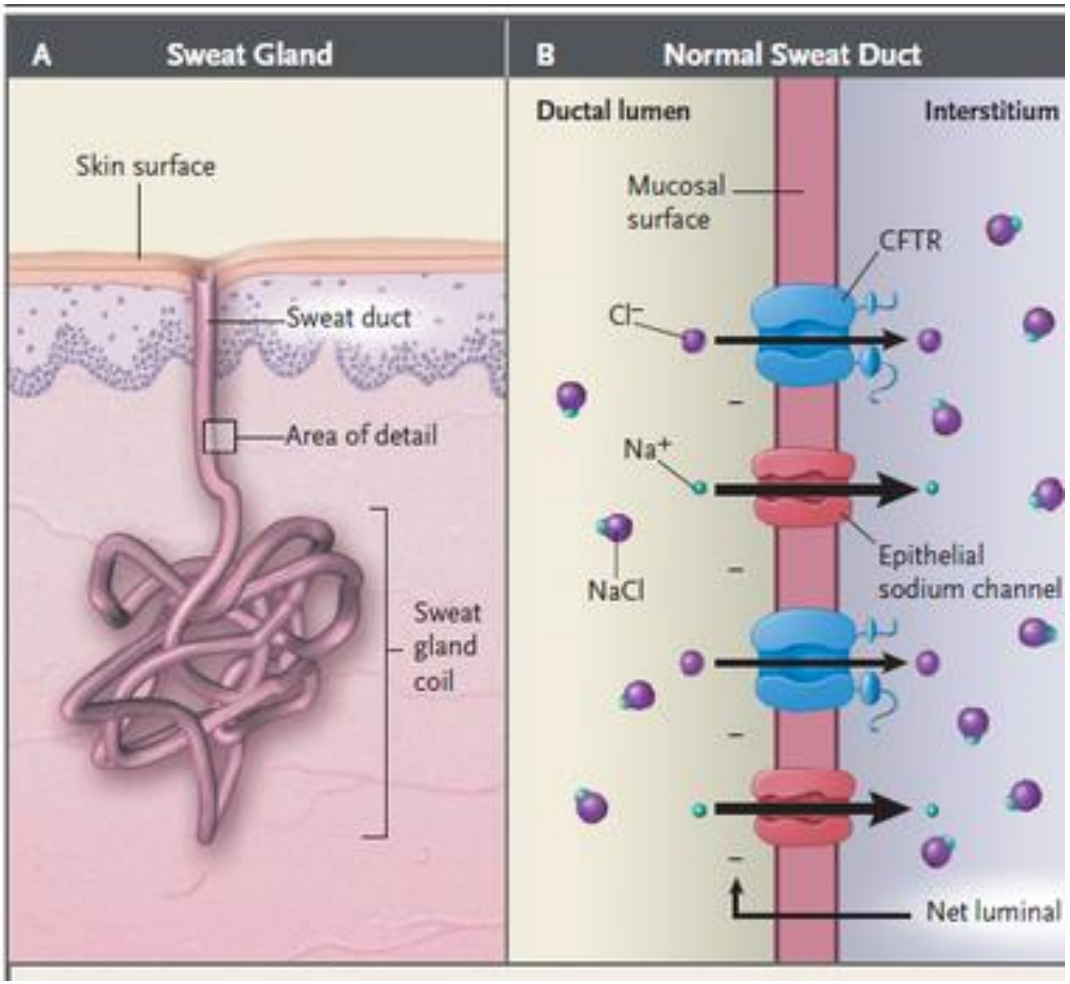


Cystic fibrosis

- CFTR normal function is helpful in muco-celiary clearance
- CFTR normal function is also helpful in re-absorption of Cl^- ions from sweat. In sweat glands CFTR is oriented in opposite direction

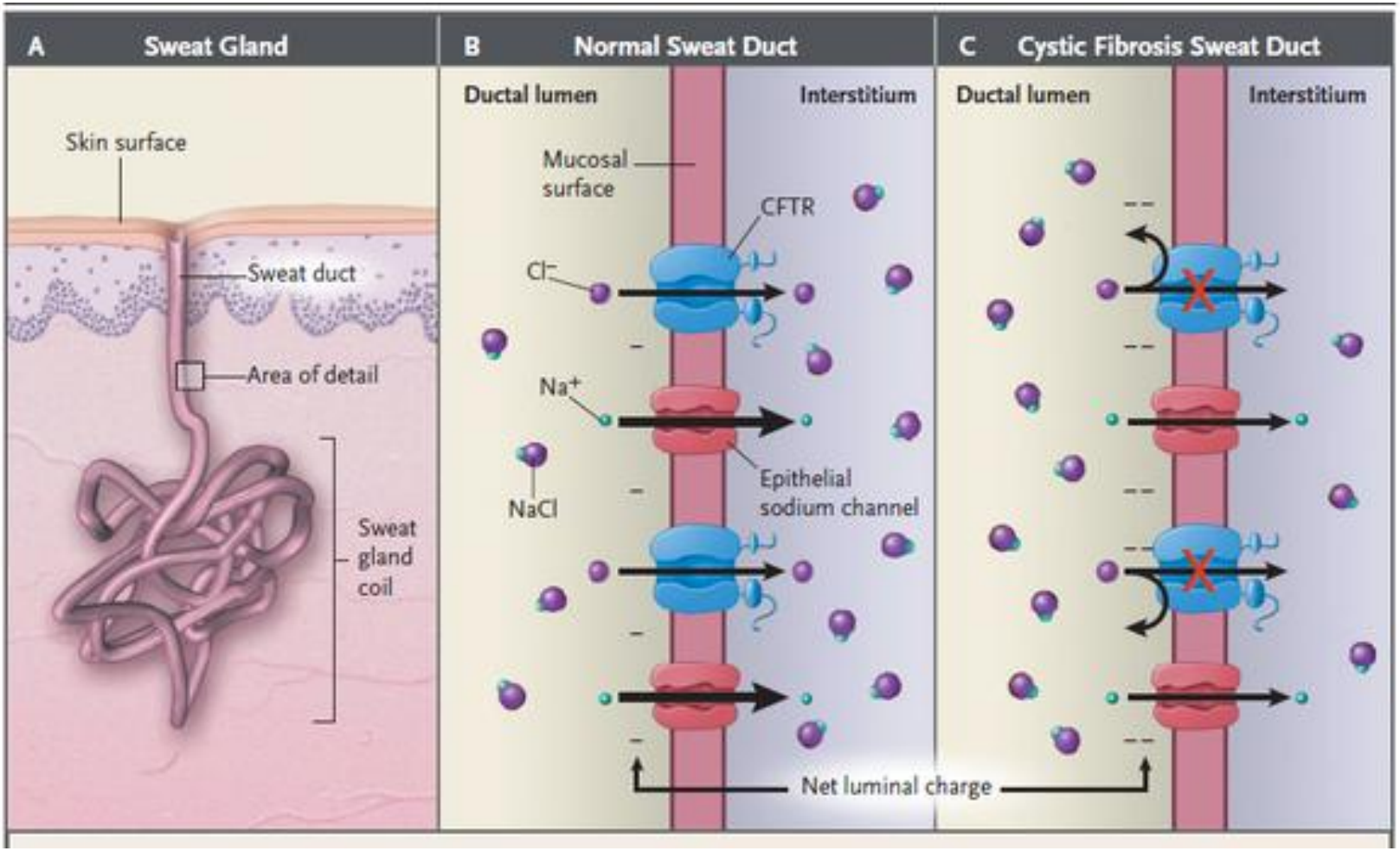
Cystic fibrosis

- CFTR function in sweat gland



Cystic fibrosis

- CFTR function in sweat gland



Sweat analysis

- Two methods of sweat analysis are most commonly used
- 1. Chloride concentration – used for diagnosis of CF
- 2. Conductance measurement – used for screening of CF

Sweat analysis

- Sample collection
- Earlier methods used to induce sweat production in humid high temperature room

Sweat analysis

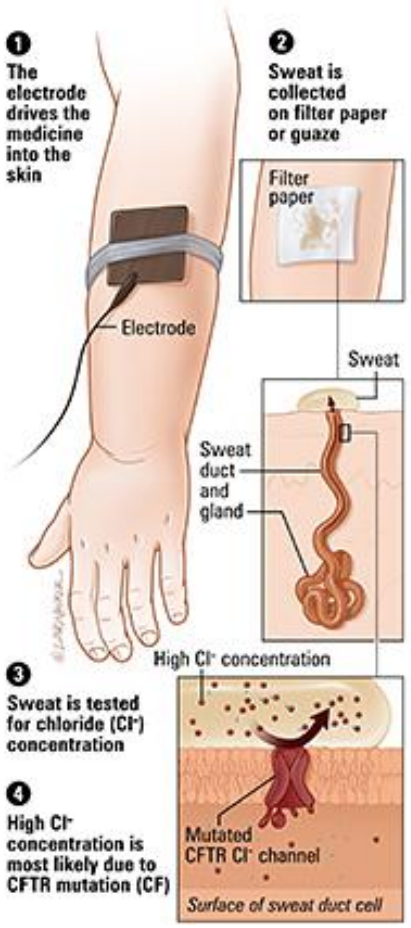
- Sample collection – earlier methods

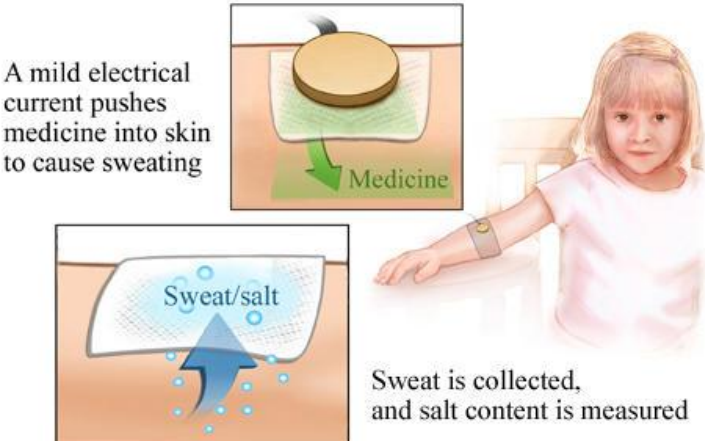
Sweat analysis

- Sample collection
- Current methods use a small amount of sweat stimulating liquid (pilocarpine) applied on small patch of skin on arm.
- An electrode is placed over the site and a weak current is passed to simulate the area
- After the area is cleaned, sweat can be collected on to a piece of gauze or filter paper

Sweat analysis

- Sample collection – new methods





Sweat analysis

- Normal and abnormal values

Chloride Concentration (mmol/Liter)	**Result**
Less than 40	Normal
40-60 mmol/L	Inconclusive
More than 60	Abnormal

Next class….

- Seminal fluid